

**AN IMAGE SENSOR WITH HIGH DYNAMIC RANGE LINEAR OUTPUT**Abstract of the Disclosure

Designs and operational methods to increase the dynamic range of image sensors and APS devices in particular by achieving more than one integration times for each pixel thereof. An APS system with more than one column-parallel signal chains for readout are described for maintaining a high frame rate in readout. Each active pixel is sampled for multiple times during a single frame readout, thus resulting in multiple integration times. The operation methods can also be used to obtain multiple integration times for each pixel with an APS design having a single column-parallel signal chain for readout. Furthermore, analog-to-digital conversion of high speed and high resolution can be implemented.